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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/584,943

07/05/2006

Yasushi Noguchi

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EXAMINER

ROYSTON, ELIZABETH

ART UNIT

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/584,943	<b>Applicant(s)</b> NOGUCHI ET AL.	
	<b>Examiner</b> Elizabeth Royston	<b>Art Unit</b> 1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 12-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 12-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____.                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____.  | 6) <input type="checkbox"/> Other: ____.                          |

### DETAILED ACTION

1. Claims 12-31 are pending as amended on 5/1/2009.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 12-31 rejected under 35 U.S.C. 103(a) as being unpatentable over Noguchi (US PG PUB 2003/0143370) in view of Nagata (US PN 6440185) and

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Slykhouse (US PN 3773573), as evidenced by the MATSUMOTO MICROSPHERE F-series product data.

Noguchi teaches a porous ceramic honeycomb filter with a plurality of through-holes opened in an exhaust gas inflow-side end face and an exhaust gas outflow-side end face and in which the plurality of through holes are closed alternately in opposite end face portions (paragraph 47, line 1-4). This filter made by mixing together a cordierite and silicon carbide ceramic material (paragraph 43, line 3; paragraph 44, line 3), a foamed resin (paragraph 57, line 4), and a forming auxiliary (paragraph 61, line 1-4), forming the mixture into a body (paragraph 63, line 1-4), and then firing the body (paragraph 65, line 1-6).

Noguchi does not explicitly disclose the properties or structural features of the foamed resin.

Nagata teaches a method for forming a porous substance (figure 1) by forming a mixture of a SiC ceramic material (col. 7, line 16, 21), forming auxiliary (col. 2, line 2), and a foamed resin (col. 7, line 47-51), casting the mixture into a mold to form a body (col. 7, line 51-52), and heating the thus formed body (col. 7, line 61-62). The foamed resin is formed using an acrylonitrile and methacrylate copolymer (col. 5, line 30-31), contains greater than 8wt% (10-15wt%) of a C5 gas (col. 6, line 35-48), has a particle size of 10 to 200  $\mu\text{m}$  (col. 6, line 2-3), and a shell wall thickness of 0.05 to 5  $\mu\text{m}$  (col. 5, line 52-54). Nagata specifically lists the commercially available product MATSUMOTO MICROSPHERE F-series (col. 6, line 54) as a suitable foamed resin, which has storage stability up to 40°C. Given that the composition, structure, storage temperature, and

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use of the foamed resin is the same as instantly claimed, one of ordinary skill in the art at the time the invention was made would have expected the retention of gas properties to intrinsically be the same as instantly claimed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the foamed resin taught by Nagata as the foamed resin taught in Noguchi. The rationale to do so would have been found in the teaching of Nagata that using such a foamed resin in mixtures predictably adds numerous small pores to a material (col. 3, line 16-19, line 49-50), which is in line with the motivation provided by Noguchi of using a foamed resin to create a high-porosity structure (Noguchi, paragraph 58).

Noguchi does not explicitly disclose the composition of the foamed resin.

Slykhouse teaches a 2-200  $\mu\text{m}$  diameter (col. 3, line 64-66) foamed resin made of a methyl methacrylate - acrylonitrile copolymer comprising 10-90% acrylonitrile (col. 3, line 26-29) filled with 10-25wt% gas (col. 3, line 53).

It would have been obvious to one skilled in the art at the time of the invention to combine the teachings of Slykhouse and Noguchi. The rationale to do so would be found in the teaching of Slykhouse that using such a foamed resin predictably improves the distribution of discrete gas bubbles (col. 1, line 56-64) in a mixture, which is in line with the rationale provided by Noguchi of using a foamed resin to create a high-porosity structure (Noguchi, paragraph 58).

***Response to Amendment and Argument***

6. Applicant's amendment of the specification, specifically adding the cross-reference paragraph, has overcome the objection; as such the objection has been withdrawn.
7. Applicant's amendment to claims 28-31, specifically changing "mm" to "μm", has overcome the objection; as such the objection has been withdrawn.
8. Applicant's amendment to claims 12 and 13, specifically adding "...into a formed body", has overcome the rejection of claims 12 and 13 under 35 U.S.C. 112, second paragraph; as such the rejection has been withdrawn.
9. Applicant's argument that teaching of Noguchi (US PGPub 2003/0143370) in view of Nagata (US PN 6440185) and Slykhouse (US PN 3773573), and as further evidenced by the Matsumoto Microsphere F-series product data does not successfully obviate the invention claimed by applicant has been fully considered and is found unpersuasive.
10. Applicant argues that Nagata's C5 gas is an element separate from Nagata's foamed resin. The examiner respectfully disagrees.

Nagata clearly states that the hollow organic material, made from a copolymer resin (col. 5, line 26-31) as claimed by applicant, is prepared by copolymerizing the

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resin "in the presence of the low-boiling hydrocarbon to encapsulate the low-boiling hydrocarbon liquid with the shell of the thus obtained copolymer" (col. 6, line 38-42).

The examiner argues this statement clearly indicates the hollow resin encapsulates a hydrocarbon liquid when made.

Applicant further argues that at 40°C there is no heating of the low-boiling hydrocarbon liquid, and therefore the hydrocarbon liquid would be in a liquid state. The examiner respectfully disagrees.

Nagata specifically discloses isobutene and isopentane (col. 6, line 37) as examples of the hydrocarbon liquid. The boiling point of isobutene is -11.7°C and the boiling point of isopentane is 28°C, as evidenced by the CRC Handbook of Chemistry and Physics online resource. At a temperature of 40°C, both hydrocarbon liquids listed would be in their gaseous state. The examiner therefore argues that the hollow organic material disclosed by Nagata does contain the C5 gas.

Applicant further argues that the 10-15wt% relating to the low-boiling hydrocarbon liquid does not read on the greater than 8wt% gas as claimed by applicant. The examiner respectfully disagrees and would like to remind applicant that since mass is conserved during a state change, the 10-15wt% of the hydrocarbon liquid would remain 10-15wt% of a hydrocarbon gas.

Applicant argues that the Matsumoto Spheres do not read on the foamed resin claimed by applicant. The examiner respectfully disagrees.

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The examiner agrees with applicant's assertion that the Matsumoto product will gasify under rising temperatures and that the product must be stored indoors at a temperature not exceeding 40°C in order to remain stable. However, the examiner disagrees with the conclusion then drawn by applicant that stability is therefore defined by the state change of the hydrocarbon liquid to a gas. Nowhere in the description of the product is an assertion made that the hydrocarbon must remain a liquid in order for the product to remain stable.

Furthermore, since Nagata first describes the composition of the organic hollow material and gives specific hydrocarbon liquids used to fill the organic hollow material, and then further goes on to list possible commercial products which qualify as suitable organic hollow material, it is not unreasonable to conclude that the commercial products and the organic hollow material disclosed by Nagata must be substantially similar in order to be successfully used in the invention as disclosed by Nagata. Nagata specifically discloses the commercial product Matsumoto Microsphere F series as a suitable organic hollow material. For the case of claims 12 and 13, the Matsumoto Microsphere F product is used to demonstrate that comparable organic hollow material is known to be stable and storable at temperatures of 40°C.

Applicant argues that the specific problems, relating to the cracks generated during firing of the ceramic and the deforming of the body during the foaming of the organic agent, and are solved by the method claimed by applicant is not addressed by Noguchi in view of Nagata and therefore the motivation to combine the references is



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lacking. The examiner respectfully disagrees that the motivation to combine is lacking and reminds applicant that resolving a potentially new problem with a method that has been previously disclosed by the prior art does not constitute patentable novelty under 35 U.S.C. 101. Furthermore, the motivation to combine the teaching of Nagata with the teaching of Noguchi, as described in paragraph 3 on page 4 of the previous Office action, was that the use of such foamed resins as taught by Nagata predictably adds numerous small pores to a material (Nagata, col. 3, line 16-19, 49-50). Since the objective of the invention taught by Noguchi is to use a foamed resin to create a high-porosity structure (Noguchi, paragraph 58), it would have been obvious to one of ordinary skill in the art at the time of the invention to use a foamed resin capable of adding numerous small pores to a material in the invention of Noguchi to create a high-porosity structure.

### ***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Royston whose telephone number is 571-270-7654. The examiner can normally be reached on M-Th 8:00am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/E.R./

Patent Examiner, GAU 1791

/Christina Johnson/

Supervisory Patent Examiner, Art Unit 1791